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A VISUAL METHOD FOR DETERMINING THE PENETRATION OF INORGANIC SALTS IN TREATED WOOD.

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A VISUAL METHOD FOR DETERMINING THE PENETRATION OF INORGANIC SALTS IN TREATED WOOD.

ZINC CHLORIDE.

In the preservative treatment of wood with zinc chloride or other salts it is often desired to know the depth of penetration which has been attained in any particular charge or series of charges. The usual way of determining this is to analyze the wood for its zinc chloride content per inch from the perimeter to the center, a method both tedious and expensive. To obtain a simpler and cheaper method the following, which might be termed the visual method for the determination of the penetration of zinc chloride, has been devised.

It is a well-known fact that the ordinary salts of zinc are all either white or very pale in color, so that all chances of forming a colored salt with this metal are eliminated at the start. Several dyes of various natures have been added to the treating solution in the hope of fixing them in the wood to the same depth as the zinc chloride, but such methods have failed, either because the dyestuffs were insoluble in the treating solution or because they were precipitated on the outside of the wood. Advantage was finally taken of the decolorizing action of soluble zinc salts on uranium ferrocyanide. Zinc salts, in slight excess, will completely decompose the colored uranium ferrocyanide, with the formation of a white precipitate of zinc ferrocyanide. This property of zinc salts has been made the basis of a visual test.

DESCRIPTION OF THE TEST.

A representative disk of the treated wood is cut as a test piece. The freshly cut surface is dipped for an instant in a 1 per cent potassium ferrocyanide solution. The entire surface should be moistened, but the disk should not remain in the solution more than 10 seconds. After the disk has been thus moistened the excess of the solution is removed from the face by blotting paper. The moistened block is then dipped into a 1 per cent solution of uranium acetate and allowed to dry. At first the whole block may have a reddish tinge, but, on drying, the untreated portions will have a dark red or maroon color, while the treated portions will be slightly whiter than the natural wood.

On account of the color of the uranium ferrocyanide the test can not be used on red oak, because the natural color of the wood masks that of the uranium compound.

ACCURACY OF THE TEST.

In order to ascertain the accuracy of this method, a section of a pine tie which had been previously analyzed for its zinc chloride content in each inch from the perimeter was treated by the visual method.

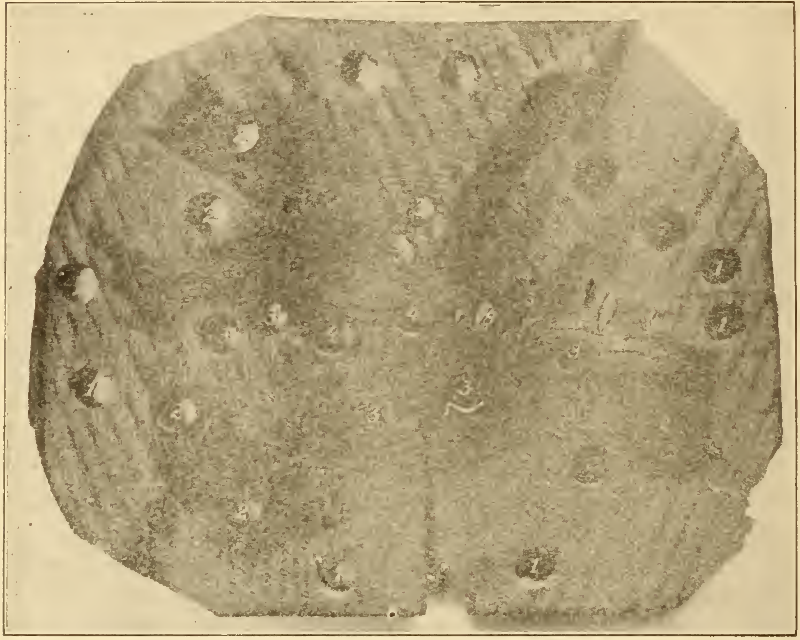

FIG. 1—Section of a treated tie showing the borings made for zinc chloride analysis and the white coloring produced by the visual test.

In the illustration (fig. 1) the dark portions are the untreated areas, while the lighter portions contain more or less zinc chloride. The analysis of the block is given in Table 1.

TABLE 1.—*Result of analysis of a section of tie for determining the absorption of zinc chloride.*

Portion from which borings were taken.	Number of borings.	Zinc chloride found.
		Lbs. per cu. ft.
First inch....	8	0.77
Second inch..	8	.64
Third inch...	8	.28
Fourth inch..	3	.17

The wood adjacent to all of the eight holes marked (1) shows zinc chloride, and by analysis contains an average of 0.77 pound of salt per cubic foot of wood. Four of the eight holes marked (2) are in the white (treated) wood, and the other four show only a partial treatment. The average absorption of these eight borings was 0.66 pound per cubic foot. Of the eight holes marked (3) only two are in the completely treated region, five are in partially treated wood, and one in a practically untreated spot. The average of the borings was 0.28 pound per cubic foot. The three holes marked (4) all show partial treatment in the surrounding wood, and the analysis of the borings showed an absorption of 0.17 pound per cubic foot. It is therefore evident that the visual test is capable of detecting the presence of zinc chloride in treated wood when present in amounts as small as 0.17 pound of salt per cubic foot of wood, or, rounding off the second decimal, 0.2 pound per cubic foot.

OTHER INORGANIC PRESERVATIVES.

Although zinc chloride is the principal inorganic salt used in the preservation of timber, yet several others have been and are used to a greater or less extent, among them mercuric chloride, copper sulphate, iron salts in various forms, etc. For such salts the same general method of testing the penetration may be applied as for zinc chloride, except that a double dipping process is unnecessary, since all the other common metals form some colored compounds which can be made to show their presence directly. In testing for copper, for instance, it would only be necessary to dip the section under examination in a solution of potassium ferrocyanide. The presence of copper would be shown by a dark red coloration in the treated zone. With salts of iron the same reagent would give a deep blue coloration in the treated zone.

When mercuric chloride is used as a preservative the depth of penetration can be determined by treating the test disk with a solution of hydrogen sulphide, which can readily be prepared for this test by acidifying a solution of sodium sulphide. The penetration is indicated by a black precipitate of mercuric sulphide.

Approved:
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Secretary of Agriculture.
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